

Use of Satellite Imagery and Products in the Caribbean

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ABSTRACT

The Caribbean Institute for Meteorology and Hydrology (CIMH) currently has access to high-resolution satellite imagery through an arrangement with CIRA. The imagery is an integral part of satellite training and research at the Institute. RAMSDIS software is used in analysis and display of the imagery.

Satellite imagery and data from NOAA's satellites are widely used by the Meteorological Services in the region in analysis and forecasting. RAMSDIS online imagery is also available via the Internet.

Continued access to high quality satellite data and products is important to the Institute and to the Meteorological Services.

Introduction

Meteorological satellites have made a significant contribution to recent improvements in weather analysis and forecasting. This contribution is probably more significant in the tropics where observations are few over vast expanses of oceans. The islands of the Eastern Caribbean are a good example, with few observations over the Atlantic Ocean. The major weather systems which affect this region come mainly from Africa during the summer, and without the use of satellites a number of these systems might well reach the islands without being detected. Imagery and data from NOAA's satellites are therefore of critical importance in analysis and forecasting by the meteorological services of the region. Cognisant of the importance of satellite information, the Caribbean Institute for Meteorology and Hydrology (CIMH) has placed particular emphasis on this area in its training programmes.

CIMH, as a Regional Meteorological Training Center (RMTC) of the World Meteorological Organization (WMO) in the Caribbean, was chosen to participate in a demonstration project designed for the RMTC (a) to become familiarise with digital GOES satellite data and products; (b) to participate in joint research projects utilising GOES digital data; and (c) to develop training cases for use by the RMTC. This is a cooperative project which also involves NOAA's Cooperative Institute for Research in

the Atmosphere (CIRA) and the Cooperative Institute for Meteorological Satellite Studies (CIMSS).

The Regional and Mesoscale Meteorology (RAMM) Advanced Meteorological Satellite Demonstration and Interpretation System (RAMSDIS) is used to ingest, display, and analyse the high-resolution digital satellite imagery on a powerful, low-cost PC workstation. The machines being used were provided by CIRA. CIMH has direct access to half-hourly high resolution images through a CIRA server. The data consist of VIS, IR and water vapour sectors for the Eastern Caribbean region which are used in training and research. In addition, CIMH receives hourly imagery from CIRA on a monthly basis to be used mainly in research.

Present Use of Data

The Barbados Online from CIRA and other satellite imagery are an integral part of satellite training at the Institute, particularly in daily weather discussions and presentations by the students during the practical portion of their courses. The Barbados Online, part of the RAMSDIS Online, is a Java-based package for satellite display on the World Wide Web. It provides real-time half-hourly images and animated sequences.

In addition to training, research in satellite meteorology is undertaken at the Institute. The research focuses mainly on the application of satellite imagery in weather analysis and forecasting by investigating weather systems with the use of satellite imagery. As an example, a study of a severe flooding event in St. Lucia during 1996 has been completed. This is a web-based presentation which will be used in future training, both at CIMH and in the regional meteorological services.

Also in the area of research, CIMH has started a study of cloud climatology over the Eastern Caribbean. Cloud frequency composites of GOES infrared imagery using various threshold temperatures have been created for the period 1998 to 2002. This work, which is continuing, is aimed at providing regional cloud frequency distributions and identifying diurnal, monthly, and inter-annual variations in cloud cover on local and regional scales.

The meteorological services in the English speaking Caribbean provide services for aviation, in addition to providing local and some regional forecasts. Satellite products are critical for the provision of these services. All of the services have access to satellite imagery, with some having the capability of receiving and processing high-resolution images. In addition, ample use is made of some of the derived satellite products which are available via the Internet. The satellite imagery and data from NOAA's satellites is therefore widely used by the meteorological services in the region in analysis and forecasting.

Future Use of Data

The additional satellite products and services which are to be provided in the future should be beneficial to the regional meteorological services and should lead to improvement in weather analysis and forecasting. Research possibilities should also increase for CIMH, and it is expected that the results of this research would contribute to

the improvements in the products being distributed by the services. In addition, with the acquisition of a higher speed Internet line, CIMH will be in a position to receive the high-resolution images in real time.

It is hoped that CIMH, through research and investigations, can add value to some of the products and make them available to the regional meteorological services. Currently CIMH does not produce any products for distribution outside the Institute. Consideration was once given to the establishment of a centre at CIMH for the distribution of satellite imagery and products to the meteorological services in the Caribbean. This idea should be revisited as the establishment of such a centre could provide value added products in real-time for the meteorological services, especially those without satellite reception capabilities. One problem likely to arise out of the establishment of this centre would be the lack of high-speed Internet connections in most of these services.

In summary, continued access to high quality satellite data and products is important to the training and research efforts at CIMH and to the improvement of weather analysis and forecasting in the meteorological services of the Caribbean.